

also in this edition:

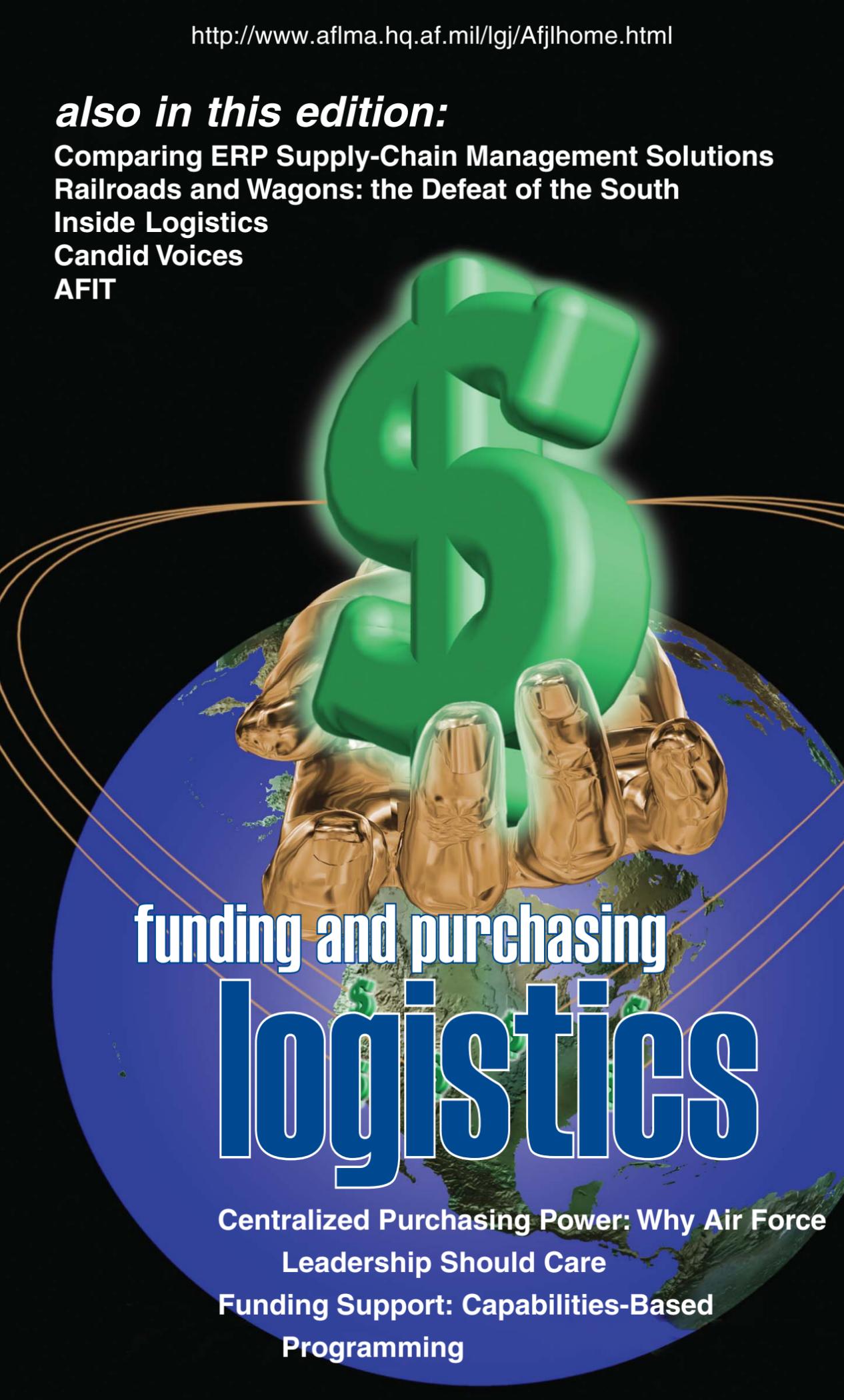
Comparing ERP Supply-Chain Management Solutions

Railroads and Wagons: the Defeat of the South

Inside Logistics

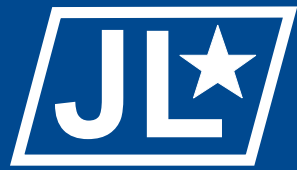
Candid Voices

AFIT



funding and purchasing
logistics

**Centralized Purchasing Power: Why Air Force
Leadership Should Care**
**Funding Support: Capabilities-Based
Programming**



AIR FORCE JOURNAL
of
LOGISTICS

Volume XXIV,
Number 1
Spring 2005



EXPLORING THE HEART OF LOGISTICS

Smarter Not Harder: Improving the Wheel and Tire Buildup Process

Captain Jason York, USAF
First Lieutenant Garrett Knowlan, USAF

The men and women of the 62^d Maintenance Squadron Wheel and Tire (W/T) Section at McChord AFB, Washington, working hand in hand with the Flight Support Section of the 62^d Logistics Readiness Squadron, have developed and implemented a textbook example of lean logistics. Their innovations have reduced the turn time for W/T assemblies from 7-¾ hours to 2-½, a reduction of more than 66 percent, while making 6 of the 11 authorized persons available to support other requirements.

Simply put, the old way of doing business would not allow them to keep up with the current demand. The shop is the sole supplier of C-17 W/T assemblies for McChord and the entire Pacific Theater. Even with the demands of the Global War on Terrorism, shop personnel were able to build up (excluding leak check) 59 W/T assemblies in 6 hours with no notice and allow the 62^d Airlift Wing to respond to the December 2004 South Asian tsunami tragedy with 75 sorties of humanitarian relief. Without this team's innovation, lack of W/T assemblies eventually would have slowed the wing's response.

Prior to 2002, the process of building up and breaking down the tires was 100-percent manual, backbreaking labor. Members used a generic 1965-model bead breaker (a relic of the C-141 days), which required them to balance a 400-pound-W/T assembly on a 10x10-inch platform and hoist it 2 feet off the ground. This posed a safety hazard, as tires often fell from the breaker. Once the wheel was separated, members had to spend 30-plus minutes manually cleaning a set of 18 bolts to prepare them for NDI, where half would be returned requiring additional cleaning. This was also a safety concern as the members were exposed to cadmium (carcinogenic).

To clean the wheel, the technicians had to lift the 160-pound halves manually 4 feet to place them in the jet washer. Once clean, the wheel halves were removed manually, placed onto a trailer, and transported to NDI. Once inspected, the wheels were placed back on the truck and returned to the W/T shop for the buildup process. In an average shift, members would lift 30 wheel halves manually six times, accounting for more than 28,000 pounds of lifting per person in 1 day!

The buildup of a new W/T assembly was just as physically grueling, requiring several steps of lifting and moving the heavy assemblies. First, two members would lift the wheel halves up to the tire. The wheels then were secured to the assembly by manually torquing 18 tie bolts to 175-foot pounds with a 15-pound torque wrench. The members did this while crouching on the floor in a very uncomfortable, awkward position. After completion of the torque, the tire was moved to the inflation cage. This process required an individual to monitor the inflation manually, shutting off the valve to read the pressure. When operating at maximum efficiency, the buildup or teardown process required lifting 100-160 pounds 14 times. Back injuries in the section were commonplace, requiring an average of 6 weeks of light duty per year. From 2000 to 2003, the Logistics Readiness Squadron and the Maintenance Squadron had 12 documented mishaps entailing serious back injuries, broken bones, and equipment damage as a result of the W/T production process. As the operations tempo increased, the day-to-day operation of manually breaking down and building assemblies crushed the morale of the section. These conditions motivated both the Logistics Readiness Squadron and the Maintenance Squadron to seek a better way.

Shop personnel took the lead in the wing by using lean logistics concepts to trim inefficiencies from the process. After transitioning to a larger facility, imagination and leadership support became the only limitation—and the W/T Section had plenty of both. After researching many corporate wheel and tire facilities and highlighting the latest available technology, the Maintenance Flight leadership relayed their pioneering ideas to supervision, who received them with enthusiastic approval. The process had begun.

The first area for improvement involved equipment. Personnel researched and acquired a new bead-breaking system certified specifically for the C-17A. With the new machine, technicians simply roll the 400-pound assembly onto the device and break the bead 3-5 minutes faster without ever lifting the tire off the ground, eliminating a significant hazard. A local contractor then

installed a ceiling hoist system, which lifts the 160-pound wheel halves into and out of the washer with no physical strain on the individual. It also allows members to guide wheels effortlessly through the shop with minimal physical exertion. Shop personnel then located an ultrasonic washer, which reduced the labor needed to clean the tie bolts from 30 minutes to 30 seconds (the time required to load the washer). The washer also cleans the bolts to NDI standards the first time, every time.

The two-person, manual torque procedure was replaced by the Wheel Assembly Torquing System—a machine that hydraulically lifts the W/T assembly and allows one person to mechanically torque the entire assembly in less than 2 minutes. The new torque system automatically applies the prescribed torque simultaneously to two tie bolts opposite one another and eliminates human error and fatigue. An additional, computer-monitored servicing cage was added to allow for the concurrent servicing of tires, which turns off automatically when complete. This allows personnel to roll the W/T assembly into the cage, press start, and move on to the next buildup.


After a thorough *leaning out* of the buildup and teardown processes, the team redefined its relationships with outside agencies. One of the most labor-intensive steps (and the leading cause of injury to personnel and damage to equipment) in the lengthy process involved transporting the wheel halves and tie

bolts to NDI. The solution to this problem was quite simple: instead of bringing the items to NDI, members set up a station in the new facility and enabled NDI personnel

to perform their inspections in the W/T Section. The wheel halves are now delivered directly from the washer to an NDI station via the hoist. In addition to eliminating damage and injury, this innovation allowed W/T technicians to remain in the work area and eliminated a major inefficiency from the process.

With a new facility and a more efficient process, asset distribution then remained the only issue. This challenge was met by establishing a consolidated supply point within the facility and submitting a work order to Civil Engineering to construct an overhead mezzanine with a service elevator for storage of built-up assemblies. When a customer orders an item, a technician walks upstairs, rolls the asset to the elevator, and lowers it to the shop floor. There is literally no wait time.

The airmen on the floor who saw a better way were the backbone of this effort. By utilizing teamwork and initiative, Team McChord developed a process that is the benchmark for Air Mobility Command.

Captain York is the Maintenance Flight Commander, 62^d Maintenance Squadron, McChord AFB, Washington. Lieutenant Knowlan is the Assistant Maintenance Flight Commander, 62^d Maintenance Squadron. 

High-Altitude Intercontinental Precision Airdrop: A Revolution in Mobility Affairs (Could AMC Learn from the B-2 PGM Model?)

Major Peter A. Garretson, USAF

The union of precision-guided munitions (PGM) and stealth technology has brought about a revolution in military affairs that has affected the way we conduct warfare dramatically. In a recent visit to Dover AFB, Delaware, Secretary of the Air Force James Roche noted that with just a few B-2 aircraft armed with PGMs a small number of aircrews could carry out most any off-the-shelf war plan. Imagine several long-range intercontinental bombers launched from the continental United States (CONUS) delivering enough ordnance to have a strategic impact in just one sortie. Could such a model be expanded to airlift platforms? Why not?

Capability currently exists for strategic airlift assets to deliver airdrop loads from CONUS to overseas locations. These same assets are capable of precision airdrop. This concept is similar to—but not exactly—the scenario described by Roche. B-2s deliver explosive ordnance—airlift platforms generally do not. So why use strategic airlift assets to carry out an airdrop mission with impact at the strategic level?

Mobility may be less glamorous than dropping bombs, but airdrop has proven vital during Operations Desert Shield; Desert Storm; Iraqi Freedom; and particularly, Enduring Freedom. Airdrop can provide the sole method of resupply in a landlocked theater of operations and is likely to become even more critical in future conflicts given increases in range, speed, and responsiveness.

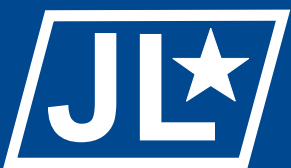
If Enduring Freedom and Iraqi Freedom are decent indicators, we can expect operational plans to be carried out by

geographically dispersed, highly mobile land units that consume expendable material as fast as they move. Future wars likely will resemble Iraqi Freedom in that they are waged with comparatively small numbers of US troops moving across vast distances without completely secure supply lines. Future operations will take place in areas where land-based supply lines are highly vulnerable to disruption as experienced during Iraqi Freedom. These attributes make aerial resupply an attractive prospect.

Tactical airlift aircraft require a significant in- or near-theater infrastructure to be built, seized, borrowed, or even leased. Transloading from strategic aircraft adds complexity, slows velocity, and multiplies the number of sorties. Building airfields is not cost-effective, seizing airfields has risks of its own, and borrowing or leasing becomes more difficult as basing options dwindle and fall victim to the winds of political and public opinion. Fixed bases also must be defended and forces tied down for this task. Further, operating airfields on foreign soil is increasingly risky with the ever-increasing danger of man-portable air defense systems. An option not requiring fixed overseas bases or airfields would have appeal.

The argument can be made for intercontinental precision airdrop based on these trends. How then would it be accomplished? Let us look at some options:

- One approach would be to develop this capability with current airframes and packaging systems. This pragmatic and useful



NEW!

Coming in Future Issues

- Agile-Combat Support Studies
- Supply Chain Management
- Key Logistics Problems Analysis

Available Now

New Monographs: What You Need, When You Need It!

Our newest books and monographs have been produced with the style and quality you've come to expect—a high-impact format that gets and keeps your attention. If you're used to seeing or thinking of products of this type as colorless and dry, you'll be more than surprised. *Old Lessons, New Thoughts* and *2004 Logistics Dimensions, Volumes 1 and 2* are available now.

